## Jovian neutrino signatures of annihilating dark matter

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We propose the first method for water Cherenkov detectors to constrain GeV-scale dark matter (DM) below the solar evaporation mass. While previous efforts have highlighted the Sun and Earth as DM capture targets, we demonstrate that Jupiter is a viable target. Jupiter's unique characteristics, such as its lower core temperature and significant gravitational potential, allow it to capture and retain light DM more effectively than the Sun, particularly in the mass range below 4 GeV where direct detection sensitivity diminishes. Our calculations provide the first sensitivity estimates to GeV-scale annihilating DM within Jupiter using neutrino detectors, showing that these surpass current solar limits and spin-dependent direct detection results.

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